

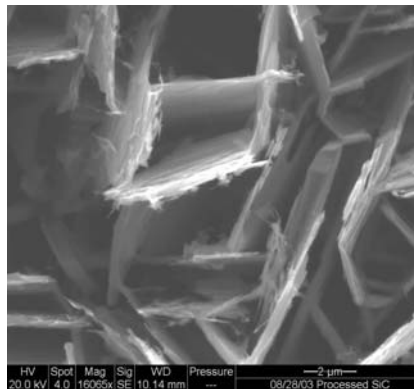
## Materials Science

# THE FORMATION OF CARBON NANOTUBES ON A SILICON CARBIDE WAFER SUBSTRATE

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We will report on the process of creating carbon nano-structures on a silicon carbide wafer substrate. The room temperature materials processing was accomplished by laser vaporization using a 3-kW CO<sub>2</sub> laser in a flowing argon gas. The chemical composition analysis using Energy Dispersive X-ray Spectroscopy (EDS) indicates that processed regions on the wafer are pure carbon materials, while the unprocessed region is mainly SiC. In few cases we observed regions of pure Si in the outer edges of the processed regions that contains nanotubes. Sharp first and second order Raman spectra of the processed samples indicate highly order carbon structures, while Raman frequencies indicate the structures observed to be carbon nanotubes and ropes. Using Scanning Electron Microscopy (SEM), it was possible to see that most nanotubes are bundled together in closely spaced rope-like microstructures and thin films, while some have formed hexagonal box-like configurations. Different laser power levels and laser dwell times have produced varying results in the amount of surface area that formed the nanotubes. The correlation between the laser power density and energy density with the percent yield of the nanotubes will be discussed.



SEM micrograph of carbon nanotube structures produced by laser vaporization of SiC.

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